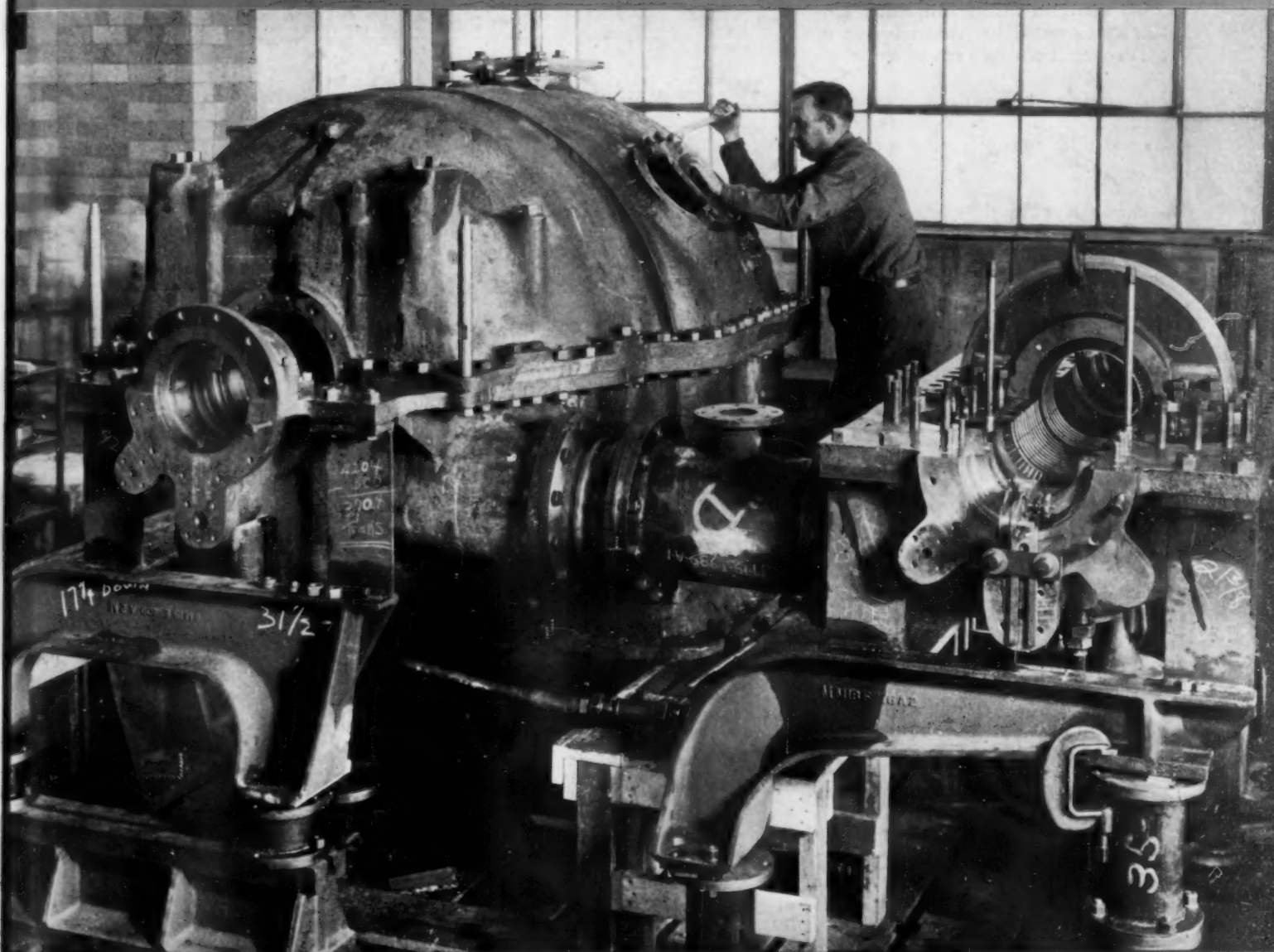


SCIENCE NEWS LETTER

TECHNOLOGY

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 29, 1943



For Power

See Page 345

A SCIENCE SERVICE PUBLICATION

Do You Know?

A good milch goat will give 1,500 quarts of milk a year.

Forest lands in the United States are equivalent to nearly five acres per person.

The summer *drought* just ended in Argentina is reported to have been one of the worst experienced in 50 years.

Oil shales in the United States contain an estimated 144 billion barrels of oil, two-thirds of which can be recovered.

A pliable, transparent, water-proof plastic material forms a *cover-slip* for Garand rifles during landing operations of troops.

Puerto Rico, partly isolated by war conditions, has increased its production of agricultural food products by 26% over pre-war levels.

More than a thousand acres of idle wasteland in New York State were planted this year by 4-H club members with over a million *forest-tree seedlings*.

A new fungicide called *fermate*, ferric dimethyl dithiocarbamate, promises to be satisfactory for several agricultural purposes, including control of the downy mildew of tobacco.

The term *glass*, formerly applied only to soda-lime or potash-lead silicates, is now extended to include borates, phosphates, and synthetic resins of various degrees of transparency.

Question Box

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RESOURCES

For what is the switch of a cow's tail used by the Army and Navy? p. 344.

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

Delivery of five merchant *ships* a day has now become routine, according to the U. S. Maritime Commission.

Methane gas, known also as firedamp, is most abundant in the coal seams east of the Mississippi River; it runs from 90% to 99% pure.

In an *egg-laying* contest held in New York State, a hen of the Rhode Island Red breed laid an egg a day for the six months ended March 31 this year.

For interior *painting*, America prefers colors of cream, ivory and buff families; these tones constitute 67% of all sales.

A practical substitute for *rubber* must be extensible, resilient, tough, resistant to drying, little affected by climatic temperature changes, and waterproof.

Acid para *fuchsin*, organic dye brilliant red in a neutral or acid solution, can be used to detect the rare metal palladium in the presence of most any other metal.

SCIENCE NEWS LETTER

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ASTRONOMY

New Sunspot Cycle

First group observed at Mt. Wilson and photographed at Naval Observatory. First time since 1889 that first spot is so far south of equator.

► THE SUN has just entered on a new 11½-year sunspot cycle, during which the freckles on his face will become more and more numerous for half that period, and then wane to a minimum in 1954 or 1955. The first group of spots identified as belonging to the new cycle was photographed at the Naval Observatory by Mrs. L. T. Day. It was observed and its magnetic polarity noted by Edison Hoge at Mt. Wilson Observatory, Calif.

First indication that the new spot group is the first of a new sunspot cycle

was given by their position, well away from the sun's equator. The last spot group of the old cycle, close to the equator, was visible at the same time. Then an instrumental check-up showed that their magnetic polarity is opposite to that of spots in the cycle just closing. This reversal of polarity is a "sure sign" of the opening of a new cycle.

Sunspot abundance has been shown to have a direct relation to radio reception. When they are most numerous, the sun is giving off intenser streams of atomic

particles, which affect the height of the world's "radio roof," the Kennelly-Heaviside layer, and hence the range of radio signals.

Possible effects upon terrestrial weather of solar radiation connected with sunspots is still a much-debated point.

Several notable particulars were pointed out in the wire from Mt. Wilson Observatory which notified Science Service of the first observations made there.

"The first sunspot group definitely belonging to the new cycle was observed by Edison Hoge on May 16 at 9 a.m., PWT, at the 150-foot tower telescope of Mt. Wilson Observatory.

"The spot group extended from heliographic latitude south 40 degrees to 44 degrees, and had magnetic polarities opposite to spots of the old cycle in the southern hemisphere. It thus satisfies the two fundamental characteristics of spots of the oncoming cycle: that it be in a latitude much greater than the average latitude for sunspots (15 degrees), and that it have a magnetic polarity opposite those of spots of the old cycle in the same hemisphere.

"This is the first time since 1889 that the first spot of the new cycle has been so far south of the equator. The first spot of the present old cycle was seen on Oct. 10, 1933, in latitude 26 degrees north.

"The spot appeared near the edge of the sun's disk that is being carried from view by the solar rotation. When last observed on May 17, it was increasing in area. The spot will vanish on May 19 and if it survives the journey on the side of the sun turned away from the earth should reappear on June 3."

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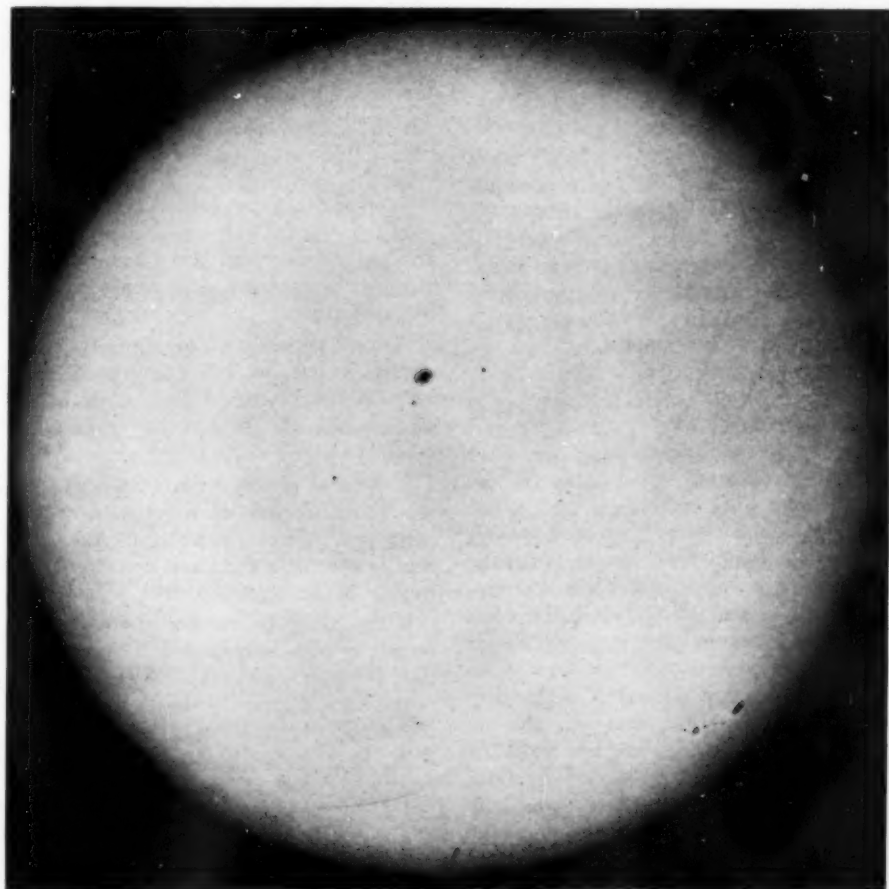
DENTISTRY—NUTRITION

Tooth Decay Can Be Prevented by Proper Diet

► TOOTHACHE, that bugaboo of youngsters, may become a rare occurrence when an ideal diet is eaten throughout childhood. This hope is raised by three years of experiments just reported to the American Dental Association by Dr. Julian D. Boyd of Iowa City, Iowa.

After observing children at the State University of Iowa for 17 years and making an intensive study of more than 200 children during the project just completed in collaboration with the late Dr. Charles L. Drain, Dr. Boyd declares:

"Surely, the dietary approach offers the most effective means of attack on the



NEW SUNSPOT GROUP—This photograph taken on May 17 at 12:15.55 p.m., EST, at the U. S. Naval Observatory shows the new sunspot group in the lower right. It is unusual for the first spot of a group to appear so far south of the sun's equator. It broke out on the sun's face and did not first appear in view over the edge, as sometimes happens. The group in the center with the dark spot belongs to the old cycle.

problem of caries now available, and furthermore is one which is in step with current policies for the furtherance of public health.

"With prevalent improvement of children's diets, the seriousness of dental caries as a public health problem will decline to minor proportions."

Evidence that sugar content of the diet is probably of secondary importance will be presented in a forthcoming report by Dr. Boyd.

The diet of each child included in the studies was designed to be as near the nutritional ideal as possible. A strict regimen was possible because all of the children were under medical supervision because of diabetes.

Possibility that the disease itself had influenced the rate of decay was eliminated; amount of fluorine in the water, considered a factor in preventing decay, was also taken into consideration. Diet alone, the scientists finally concluded, influenced the rate of decay.

Public Health Service statistics indicate that the children in the area studied might expect to develop decay in two new tooth surfaces each year during the early teens, but the children observed by Dr. Boyd averaged only a fifth as much decay as expected on this basis.

Three of the children who were known non-conformists were omitted from consideration.

Science News Letter, May 29, 1943

NUTRITION

New Cereals for Army

Converted rice, proof against weevils, is delicious when cooked. Pre-mixed cereal with sugar and dried milk can be eaten dry, with water, or cooked.

► **CONVERTED** rice, too tough for the bugs but delicious when cooked for Army mess, was described to members of the American Association of Cereal Chemists meeting in St. Louis.

Before dehulling, the rice is given a steeping process that takes nutrients from the hulls and puts them inside. The starch gelatinizes, making hard finished grain after milling.

This converted rice has the keeping qualities of milled grain but retains the higher nutritive qualities of brown rice.

Declaring that the product deserves more attention, Maj. Virgil O. Wodicka of the Quartermaster Corps, explained that its hardness even discourages the weevils that often destroy Army cereal supplies.

In a laboratory test weevils were put in a three-room compartment to live for six weeks. Each section contained a different type of rice.

"At no time during this period," Maj. Wodicka stated, "were weevils seen working in the converted rice, whereas at all times, the weevils were present and thriving in the other two types."

Despite its hardness, the rice cooks up well and has the advantage of staying in separate particles instead of forming a gummy mass. The product is now being produced by one U. S. company under a British patent.

Another development just adopted for

Army rations is premixed cereal. This is a mixture of at least two cereal products with sugar and dried skim milk.

Eaten dry, mixed with cold water, or cooked, it's always palatable, Maj. Wodicka maintained. Because premixed cereal needs no cooking it can be used over a wider range of field conditions than the cereal it replaces.

Most forms of premix contain some added fat which keeps the sugar and milk powder from separating out. And surprisingly enough, this stable fat delays the rancidity of natural fats in the cereal.

With cold water, premix resembles the ready-to-eat breakfast foods. A component of the mixture rapidly takes up hot water, however, to give it the character of a typical cooked cereal.

Research is now aimed at developing a compressed product that will still reconstitute into an appetizing breakfast food.

Another method needing more research, Maj. Wodicka pointed out, is the use of a small amount of cereal in canned meats. It has been found that this prevents the separation of fat and moisture and makes the meat easier to eat and more appetizing for the soldier.

Inviting the cereal chemists to submit samples of new K ration biscuits, Maj. Wodicka admitted that one of those now in use develops an off-flavor on long

storage. To be considered, such biscuits should keep well for two years in reasonably air-tight nonmetal containers and meet other Army requirements.

Science News Letter, May 29, 1943

NUTRITION

Ten Shiploads of Pork Now Loaded on Three Ships

► **DEHYDRATED PORK**, following close on the heels of the development of dehydrated beef, is now going to the United Nations in large quantities, Herbert E. Robinson, assistant chief chemist of the Swift Research Laboratories, announced to the American Institute of Chemists meeting in Chicago.

Pork that would have filled 10 ships during the days of the first World War can now be reduced to two shiploads of dehydrated meat and a little more than a shipload of lard.

Savings in shipping space, producing the same effect as increased ship production, is possible through a process developed by the meat industry in co-operation with the U. S. Department of Agriculture.

Fresh cooked meat is ground fine, then dried slowly and evenly under carefully controlled temperatures. The finished product, in the form of light nut-brown granules, contains less than 10% moisture.

"When properly packed and vacuum sealed, it has good keeping qualities," Mr. Robinson stated. "It does not need refrigeration from time of packaging until used."

The meat is compressed during packing but resiliency of the tissues is not destroyed. When water is added later, the product has the same consistency as freshly cooked ground pork.

It can then be further prepared and served as patties, meat loaf or any other dish for which ground meat is used. The taste cannot readily be distinguished from that of freshly ground meat.

Mineral elements are reabsorbed from the meat juices during processing and temperature control keeps vitamin loss at a minimum. The high protein value is the same as in normally cooked meat, Mr. Robinson explained.

The lard is prepared in new war styles to meet Army and Navy specifications. It stays solid even at tropic heat and has a greater resistance to rancidity than ordinary lard.

Science News Letter, May 29, 1943

PHARMACY

Penicillin in Production

Making of chemical from mold, which outdoes the sulfa drugs in curing many infections, is being pushed to the utmost for military use.

► PRODUCTION of penicillin, chemical from mold, which outdoes the sulfa drugs in curing many kinds of wound infections and germ diseases, is now being pushed to the utmost to make it available for our armed forces, Dr. A. N. Richards, chairman of the Committee on Medical Research of the Office of Scientific Research and Development, reports (*Journal, American Medical Association*, May 22).

Use of penicillin was started six weeks ago to treat soldiers returned from the Pacific area with unhealed compound fractures, osteomyelitis and wounds with longstanding infection. Results of this treatment started at Bushnell General Hospital, Brigham City, Utah, have been so encouraging, Dr. Richards reports, that plans are now being made to continue studies of its value in treating both wounds and venereal disease in 16 Army hospitals. The Navy plans similar though less extensive clinical trials of penicillin.

Production of penicillin, in spite of intense efforts to meet military medical needs, has in no instance gone beyond the pilot plant stage, Dr. Richards reports. In most plants it is still in the laboratory stage. Some 16 drug manufacturing companies are now engaged in its production or intend to be soon.

The supply of penicillin for civilian needs in the near future will be very limited, he states, unless production expands at a greater rate than can now be foreseen.

Chief handicap to large scale production lies in the fact that the mold produces only very limited amounts of the germ-fighting chemical. An exceptionally high yield would be in the order of about one-thirtieth of an ounce by weight from about 20 quarts of culture medium on which the mold that produces penicillin is grown. And it takes days of mold growth for production of this minute amount.

Discovered by Dr. A. Fleming of St. Mary's Hospital, London, England, in 1929, the curative possibilities of penicillin were first revealed to the medical world in 1940 and 1941 by Prof. H. W. Florey, Dr. E. Chain and collaborators

of Oxford University. Following a visit to this country by Prof. Florey, and with the encouragement of the Medical Research Committee and the National Research Council, Dr. Richards states, research looking toward the production of penicillin was started in the fall of 1941 by Merck and Company, E. R. Squibb and Sons, Charles A. Pfizer and Company, the Lederle Laboratories and perhaps others.

More than 300 patients have been or are being treated with penicillin and Dr. Richards states "there is good reason for the belief that it is far superior" to any of the sulfa drugs for staphylococcus aureus infections with and without blood poisoning, including acute and chronic osteomyelitis, cellulitis, carbuncles of the lip and face, pneumonia, empyema and infected wounds. Penicillin is also extremely effective in treating hemolytic streptococcus infections, pneumococcus pneumonia and gonorrhea.

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PSYCHOLOGY

Psychological Association Defends Goodwin Watson

► DEFENSE of Dr. Goodwin Watson, psychologist and propaganda analyst of the Federal Communications Commission, against charges by the Kerr Committee and the Dies Committee that he is unfit for public office, was voiced in a unanimous resolution by the Eastern Psychological Association.

The Eastern Psychological Association is a professional society of psychologists located in the eastern area of the United States. The members, in the resolution, vouched for the "scientific integrity and professional competence of Goodwin B. Watson, and in the value of his present work as analyst for the Foreign Broadcast Intelligence Service." They also "regard him as a loyal citizen of the United States and not subversive in either speech or conduct."

The psychologists expressed the opinion that Dr. Watson had been wrongly accused by the Dies Committee and received inadequate hearing before the Kerr Committee.

The present action against Dr. Watson, the scientists feel, "endangers the freedom of other scientists to make their contribution to public welfare as employees of Government bureaus."

They "deplore any political persecution of civil servants, and call upon representatives and senators to see that the American tradition of fair play is upheld, and that Dr. Watson be given a truly adequate hearing, or that the charges against him be dismissed."

Dr. Watson was born in Whitewater, Wis., and is a graduate of the University of Wisconsin with A.M. and Ph.D. degrees from Columbia University. He has been on the faculty of Columbia University as an educational psychologist since 1925. He has been with the FCC, on leave from Columbia, since before Pearl Harbor, Nov. 15, 1941. The professional societies of which Dr. Watson is a member include: American Psychological Association, American Association for Applied Psychology, Society for the Psychological Study of Social Issues, American Educational Research Association, American Sociological Society, American Political Science Association, American Orthopsychiatric Association and American Society for Public Administration.

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TESTING QUARTZ — This shipment of quartz crystals from Brazil is being inspected with the aid of an arc lamp in the Electronics Laboratory of General Electric. Thin slices of the quartz crystals will be used to keep radio stations on their assigned frequencies.

PSYCHOLOGY

Why Germans Surrender

German psychologist, writing in military journal just before the war, called "conversion" to enemy cause true reason for being taken prisoner.

► **SOLDIERS** give up and let themselves be made prisoners because they come to regard the enemy as being right and themselves and their commanders as wrong: such is the doctrine on the psychology of surrender put forth by Dr. Leonhard Fritzsche of Munich only a few months before the outbreak of the war. He termed this mental shift under stress of battle as a 180-degree "change of consciousness," which he of course regarded as a "perversion."

Writing in 1938, in the military journal *Soldatentum*, Dr. Fritzsche described the process at some length. Not only "softies" and cowards, but even apparently solid soldiers, he said, are susceptible to the spiritual attrition that makes men drop their weapons and raise their hands. Here, according to this view, is what happens:

"The soldier goes to war and enters battle with a definite concept of foe and friend. Rearing, experience, observation and his judgment have given him a picture of his task and that of the army, as well as of the destiny of his country.

"Now physical experiences of a negative kind storm upon him, which make him acutely uncomfortable. Who doesn't know the feeling after forced marches, after sleepless nights, reinforced by uncertainty and the always-encroaching dread of death?

"To be sure, these are still for the most part purely physical events, manifesting themselves through stimulation of the solar plexus as digestive disturbances and the well-known 'nervous cough.'

"But now the forces of psychological defense are brought up. They try to explain the cause of the discomfort and thereby to eliminate it. But logical thought does not precede, and form a content of consciousness. Quite the contrary: the consciousness that something is amiss is already there, and a logical basis suggests itself for everything disagreeable, for every disillusionment and every failure.

"If the enemy shows himself superior, the cause is sought in the inadequacy of his own army, its equipment and armament, its organization and leadership. To

no one does this feeling of inferiority come so immediately and painfully as the soldier in the front lines.

"And now out of the depths of the unconscious arises the primitive idea: some one must answer for this failure; the luckless one is—guilty! And this "guilt": where can it be except with ourselves, with the leaders, with the high command, with the national government? Since the enemy prospers, as his superiority in weapons, organization and tactics plainly indicate, then he must be nearer right than we are."

Thus, Dr. Fritzsche explains, the poor bedeviled wretch under fire finally "agrees" with his adversary—becomes a kind of convert to the enemy.

His recommendations of what to do under such circumstances are thoroughly hard-boiled and ruthless: If you have fresh reserves, start a new front somewhere else, or establish new defensive lines. Leave the "spoiled" troops where they are—give no further thought to their fate. Never under any circumstances let "uninfected" troops mingle with them

—not even tanks and artillery. This advice seems to have been heeded by the Axis high command, so far as the final phases of the North African campaign are concerned.

A few of the opening sentences in Dr. Fritzsche's essay must make grim reading in Germany today, if anybody is troubling himself to turn back to them:

"To lose troops as prisoners to the enemy is the worst defeat a fighting army can suffer. For with them goes its chief treasure, the trained soldier, and also his weapons, ammunition and equipment.

"The sight of numerous prisoners raises the morale of the enemy, even of the civil population. Through observation and listening to prisoners valuable secrets may be discovered. They are useful also as labor manpower, and become important pawns in negotiations.

"In one's own camp, if the loss of prisoners is repeated and great, oppressive and dangerous feelings arise. The command loses the confidence of the armed forces."

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PSYCHOLOGY

Cure for Gun-Shyness In Dogs Is Sought

► **CURE FOR** gun-shyness in dogs is being sought at Cornell University's psychophysiology field station or Behavior Farm. Results of this search will later be applied, it is hoped, to relieving shell-



GUN-SHY—This dog is one of thirteen animals afraid of loud noises that are being studied at Cornell in an effort to find a cure for this fault in hunting dogs and dogs of war.

shock and other war neuroses in humans.

Thirteen gun-shy dogs have been contributed by sympathetic sportsmen. Ordinarily, gun-shy dogs are not kept, because the trouble has been considered incurable and the animals, therefore, worthless. The research is being conducted by Drs. O. D. Anderson and Arthur V. Jensen of Cornell's psychology department.

Gun-shyness is taken to mean intense nervousness and fear, not only of the sound of guns, but also of other loud

noises, such as the banging of a door, backfire of an auto, or the roll of thunder. It may extend to extreme fear of strangers or of other dogs.

The psychologists believe the basic pattern in both gun-shyness and war neurosis is one of lost nervous and emotional control. Investigations are pointed toward a study of the endocrine glands, particularly the adrenal and thyroid, for the scientists think they have an important role in the nervous and emotional life of an individual.

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MEDICINE

More Than 97% Recover

Best medical care and equipment ever supplied an army makes possible this U. S. record for recovery of war wounded. Mobile outfits important.

► MORE THAN 97% of Navy and Marine wounded have recovered; incomplete data on the Army show that there has been a like recovery of wounded soldiers.

Of all the Navy and Marine men wounded up to the first of April, only 2½% died; 53% returned to active duty.

This record is due to the best medical care and equipment ever supplied an army, declares the official OWI report.

A first-aid packet strapped to the soldier's belt is the first treatment available. If the wounded soldier is conscious he begins to take sulfa tablets as soon as he is hurt, and dusts sulfa powder into the wound. If he is unconscious, his comrades may give him this first wound treatment.

Soon a Hospital Corpsman with a larger kit of supplies comes along and quickly ministers to the wounded man. An injection stops pain almost instantly. To his belt he ties a tag, telling what treatment was given, marks the spot for the litter-bearers, and goes on.

Litter-bearers take him to the battalion aid station, which can be compared to the emergency room of an ordinary hospital.

If severely wounded, he will eventually reach the great general or base hospitals. Some cases are flown all the way back to the United States.

Flexibility is what makes the system successful; mobility is the keynote.

One of the newest mobile units is the traveling optical laboratory. When a soldier who wears glasses has them broken, an optician is right at hand. The soldier

is back on duty in a few hours.

The mobile bacteriological laboratory is a miniature Health Department on wheels. Laboratory tests show whether water is fit to drink, reveal the nature of any disease which breaks out, and checks the purity of food products.

There are also mobile X-ray machines—the best in the world. Composed of compact sections easily taken apart, an outfit can be fitted into three small trunks.

Extensive research is developing new Army and Navy medical equipment. Folding litters and folding arm and leg splints have been invented. A jungle kit contains apparatus for treating snakebite, various kinds of drugs from aspirin to atabrine, salt tablets to prevent heat cramps and an insect repellent.

The kit developed for our Arctic fighters contains material for preventing and curing frostbite, and multi-vitamins to help maintain fighting strength even on limited rations.

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GEOGRAPHY

Italian Geographical Names Not Difficult to Pronounce

► WITH TUNISIA clipped from the Nazidom, the next major operation may be on Sicily and Sardinia and the Italian boot. The well-informed American will be required to learn a lot of new geographical names.

Recent bombing objectives include Palermo, Trapani, Marsala, Messina and Catania in Sicily; Cagliari and Terra-

nova in Sardinia; Naples and Bari in southern Italy. These are now all familiar to the eye, but not to the ear.

Palermo, which has received such heavy bombing from American warplanes because of its location on the Sicilian northwest coast and its good harbor for boats and airfield for planes, is a three-syllable word with the accent on the middle syllable. It is pronounced Pah-lér-mo.

Trapani has the accent on the first syllable, Tráh-pah-nee. Marsala has the accent on the second syllable and all three "a"s are like the "a" in arm—Mar-sá-la. Messina is Me-seé-na, with the first "e" like the "e" in ebb, the second as in eve and the final letter as the "a" in ask.

Catania is Ka-táhn-ya; Cagliari is Kal-yáhr-ee. Terranova is pronounced just about as we would do it in this country. Bari is Báh-rec.

Many Italian geographical names are Anglicized in England and America. Native Italians would not recognize them. Often a different word is used. Naples at home is Napoli, pronounced Náh-po-lee, and Rome is Roma, a two-syllable word with the accent on the first syllable. Venice is Venezia, pronounced Vay-náy-tsia.

A few simple Italian pronunciations—what we are apt to call "foreign peculiarities"—will illustrate the proper way to pronounce Sicilian and Italian geographical names.

"C" is like "ch" in chin before "e" and "i"; otherwise like "k". "Cc" is also like "ch" in chin before "e" and "i" but with a distinct "t" before it: Lecce is pronounced Lét-cha.

"G" is like "j" before "e" and "i", otherwise hard. "Gg" is a prolonged "j", or "dj", before "e" and "i"; thus Reggio is Réd-jo. "Gli", when final or before a vowel, is like "lli" in million. "Gn" is like "ni" in union. "Gu" is like our "gw".

"H", as in French and Spanish, is either mute or barely audible. "Qu" is like "kw". "S" is pronounced as "z" when it is between two vowels. "Sc", before "e" and "i", is like "sh", and like "sk" otherwise; "sch" is like "sk".

"T" and "d" are more dental (pronounced forcefully, against the teeth) than in English. "Zz" is a prolonged "ts" or "dz", while a single "z" is a forceful "ts". Thus Abruzzi is A-broót-se and Spezia is Spét-sya.

Double consonants in Italian are usually both pronounced, not Ann-a but An-na, not Múss-o-lini but Mús-so-lini.

Science News Letter, May 29, 1943

NUTRITION

Vitamin B₁ Content of Wheat Affected by Weather

► VITAMIN B₁, or thiamin, content of wheat is significantly affected by weather, variety of grain and crop location. These results are revealed by a two-year research project reported to the American Association of Cereal Chemists in St. Louis by W. W. O'Donnell and E. G. Bayfield of the Kansas Agricultural Experiment Station at Manhattan.

The vitamin studied is needed in the diet to prevent beriberi and certain other nervous disorders.

Influence of climate was judged from similar wheat stands of the two seasons which varied 15% in thiamin content.

Seven wheat varieties grown at eleven Kansas experiment stations and fields during 1941 and 1942 comprised the tests.

Further studies revealed that there is no relationship between the thiamin content of wheat and the flour made from it. The scientists warned that a wheat of high thiamin content does not necessarily mean a superior flour when milled.

They caution that, although the conclusions are significant, they should not be regarded as fact until confirmed by a four- or five-year investigation.

Science News Letter, May 29, 1943

NUTRITION

Potatoes Lose Vitamin C When Mashed and Kept Hot

► DON'T MASH the potatoes (when you have any) if you want to get vitamin C from them. This new diet tip comes from studies by Dr. G. N. Jenkins, of St. Bartholomew's Medical College at Cambridge, England (*Nature*).

The advice applies particularly to cooks in restaurants, cafeterias, boarding houses and the like, where large amounts of potatoes are mashed at one time and then kept hot for periods ranging from 15 minutes to an hour or more before being eaten.

When a large batch of potatoes was mashed by hand under large-scale catering conditions, Dr. Jenkins reports, the time required was 10 minutes. About one-third of the vitamin C content was lost. After being kept hot for 30 minutes, mashed potatoes had only one-tenth of the vitamin C they had immediately after being mashed, he found in another experiment. Whether the mashed pota-

atoes or other vegetables are kept hot in bulk or in small helpings does not seem to make any difference in the amount of vitamin C lost through being kept hot for a period before serving.

Mashed potatoes for the family dinner apparently would be given scientific OK if the family is small enough and the cook efficient enough so that the potatoes could be mashed within two or three minutes and served immediately.

Vitamin C is the scurvy-preventing vitamin found abundantly in oranges and other citrus fruits, and in tomatoes. Potatoes are also a good source of this vitamin, particularly for those on limited food budgets who cannot have much citrus fruit and who eat large quantities of potatoes as a cheap and filling food.

Science News Letter, May 29, 1943

BACTERIOLOGY

Electron Microscope Turned on Syphilis Germ

► NEW pictures of structural details of the syphilis germ, never yet seen by human eye even with the highest-powered microscope, are shown and discussed in the *Journal of the American Medical Association*, (May 15) by Prof. Udo J. Wile of the University of Michigan Medical School and Miss Edna B. Kearney of the University's Hygienic Laboratory.

The extremely small, corkscrew-shaped bacterium, known to science as *Treponema pallidum*, is shown to have very fine, hair-like appendages called flagellae, which lash about to propel it through the fluids in which it lives. These flagellae were made evident in photographs taken with the new electron microscope, at an enlargement of 9,000 diameters, and the resulting pictures then given an additional tenfold enlargement. These brought out the images of the appendages very clearly.

Earlier examination of electron microscope images of the same germs by direct vision, using a fluoroscope screen, had failed to show flagellae, although there had long been reason to suspect their existence, from their behavior when viewed under the highest powers of an ordinary microscope with special lighting conditions.

Dr. Wile and Miss Kearney used germs obtained directly from infections in human cases. Two earlier investigators had also been able to photograph flagellae, but their specimens were taken from laboratory cultures.

Science News Letter, May 29, 1943

IN SCIENCE

PSYCHOLOGY

Brain Metabolism Linked With Some Mental Defects

► THE RATE at which the brain cells make use of oxygen is linked with intelligence, in some forms of mental deficiency, it was reported to the American Association on Mental Deficiency in New York by Dr. Harold E. Himwich, J. F. Fazekas, H. C. Herrlich and Edith Rice, all of Albany Medical College.

In normal persons, the brain metabolism is lowest in infancy and gradually increases with age until it reaches a peak between the ages of 20 to 29. It remains at this maximum until old age, when there is a decrease.

In the type of mental deficiency known as mongolism, however, the increase in brain metabolism is stopped short at the age of 10.

In most other types of mental deficiency, the brain is supported by normal metabolism, but the energy so produced is supplied to brain tissues that are incapable of normal action.

Science News Letter, May 29, 1943

RESOURCES

Cow's Tail-Switch Important to Army

► THE LONG HAIR in the switch of a cow's tail, used for some time as a filter for the air-conditioning in railway cars, is now being used as a filter in machinery of Canadian men-of-war, Dr. D. J. McLellan of the Dominion Department of Agriculture states.

In the United States, the sale of cattle tail hair is restricted to the armed forces. Its use is confined to Navy mattresses, parachute packs and saddle pads. Because of its sponginess and low susceptibility to moisture, the hair is ideal for padding material.

In the past, the hair was used largely in carpet sweepers and hair brushes. Only about eight inches of the cow's tail is used. At Fort Worth, Texas, nearly 150 tons of cattle tail hair was marketed annually.

Science News Letter, May 29, 1943

NE FIELDS

ENGINEERING

Cargo Ship Turbines In Mass Production

See Front Cover

► STEAM TURBINES for cargo ships are now being produced on a mass basis at the new Merchant Marine division of Westinghouse. The illustration on the front cover of this week's SCIENCE NEWS LETTER shows the low pressure unit and the high pressure unit of one of these steam turbines being test-assembled before the spindles are in place.

The low pressure unit, shown on the left, develops its power from steam which has already served to develop power in the high pressure unit. Together the two units provide 4,000 horsepower for a cargo ship propeller.

Science News Letter, May 29, 1943

CHEMISTRY

Wheat Gluten May Become "Stickum" for Envelopes

► GLUTEN, the stuff in wheat flour that sticks the bread-loaf together, may do the same for our envelopes some day. It appears to be a versatile substance; another possibility is a compound that gives a meaty flavor to dried soups.

These and other promising industrial futures for wheat gluten were discussed before the meeting of the American Association of Cereal Chemists, by Dr. H. S. Olcott and Dr. M. J. Blish, who conducted their researches at the Western Regional Research Laboratory of the U. S. Department of Agriculture at Albany, Calif.

Wheat gluten is a byproduct in the manufacture of wheat starch. At present it is not produced in large quantities because corn starch is underselling wheat starch; but this situation is not necessarily permanent, and the research was undertaken with the idea of being prepared for any possible change.

Gluten makes a good adhesive, Dr. Olcott stated, if it is dissolved in dilute ammonia. The solution forms a dry, even film on paper, does not tend to crack

readily, and when moistened seals paper in a few seconds.

Gluten was also tried out as a possible raw material for synthetic fibers. It does not do well alone, but in combination with other proteins it can be spun into fibers.

Most promising of gluten uses, already absorbing most of the commercial gluten not going into the baking industry, is its conversion into the soup-flavoring compound, monosodium glutamate, through treatment with strong hydrochloric acid. At present, Dr. Olcott reported, the demand far exceeds capacity to meet it. It is not possible at present to expand production capacity because of priority restrictions. Beet sugar waste is another source of glutamic acid used in preparing this product.

Science News Letter, May 29, 1943

MEDICINE

Lack Pep? Soldiers Can Blame It on Tropics

► SOLDIERS and sailors in the tropics who, after serving there for a time, feel listless, low and pepleless can blame it on the climate. Justification can be found in a report by Commander James L. McCartney, Medical Corps, U. S. Naval Reserve, to *War Medicine*, published under the auspices of the National Research Council and the American Medical Association.

Low blood pressure and a low basal metabolic rate are likely to develop sooner or later after residence in the tropics, Commander McCartney states, quoting reports from a number of physicians who have studied the problem. The metabolic rate is that at which energy interchanges in the body proceed. The basal metabolic rate is that for the energy of mere existence.

Low blood pressure affects many but not all persons in the tropics. It does not, however, appreciably affect those with high blood pressure. This lowering of the blood pressure resulting from life in the tropics without such other causes as debilitating tropical diseases like dysentery is due, according to one authority, to the following conditions:

Constant dilatation of the small blood vessels near the surface of the body.

Increased secretory function of the skin, such as sweating.

Visceral influences.

Constriction of the small superficial veins.

Variations in the volume and viscosity of the blood.

Science News Letter, May 29, 1943

MEDICINE

Film Reported as Advance In Protection Against Gases

► A "DECIDED advance" in protection against two war gases, Lewisite and mustard gas, is announced by Dr. C. Jelliff Carr, of the University of Maryland School of Medicine, in a report to the Society for Pharmacology and Experimental Therapeutics.

A sorbitol-gelatin film, he has found in rabbit experiments, gives protection against Lewisite vapors and liquid. Judging from preliminary experiments on humans, it protects against mustard gas as well.

Sorbitol is a sugar alcohol. The complex formed when it is heated with gelatin has found wide industrial use. The gas-impermeable character of a film of this complex suggested to Dr. Carr that it might be useful as a protection against both chemical warfare agents and industrial chemicals and solvents.

"The protection against Lewisite afforded by these films," he reports, "far exceeds in value the protection afforded by washing with soap and water alone after the period of exposure (to the gas). The use of this material by workers exposing themselves to Lewisite offers a decided advance in routine prophylaxis. The value of washing with soap and water alone after exposure to Lewisite has been amply demonstrated in these experiments," Dr. Carr adds.

Science News Letter, May 29, 1943

NUTRITION

Food Yeast for Humans Developed in England

► DEVELOPMENT of a yeast powder suitable for human food and plans for the first manufacturing plant for its production, to be set up in Jamaica, are announced in reports just reaching the United States from England.

The yeast food was developed from a strain of *Torula utilis* by Dr. A. C. Thaysen and colleagues of the Department of Scientific and Industrial Research at Teddington, England. In the *Lancet*, English medical journal, the yeast food is described as having a "slight, not unpleasant taste," and as growing rapidly and being a source of good protein as well as all the B vitamins.

The first plant for its manufacture is to be set up in Jamaica, *Monthly Science News* reports.

Science News Letter, May 29, 1943

• ASTRONOMY

Daylight Planet

You can see Venus, now very brilliant, in the late afternoon if you know just where to look. Venus passes Jupiter on June 1.

By JAMES STOKLEY

► STILL GETTING BRIGHTER, and now so brilliant that it can even be viewed in daylight if you look in the right direction, is the planet Venus. As dusk falls, it is the first star or planet to be seen, and appears high in the west. But about four o'clock in the afternoon it is directly south and, for the United States, a little more than two-thirds of the way from the horizon to the zenith. For an observer farther north, the planet is lower. So if, some June afternoon, you look carefully at the southern sky, particularly if you stand so that the sun is not shining directly in your face, you may be able to pick up this brilliant body.

There is another planet in the evening sky, too, and while quite bright also, it is about one-ninth as bright as Venus. This is Jupiter, which Venus passes on June 1. The accompanying maps show their relative positions for June 15. They are both in the constellation of Cancer, the crab, which is a group of rather faint stars between Gemini, the twins, and Leo, the lion.

Of the other naked-eye planets, only Mars can be seen during the night. It is quite prominent in the east, appearing about three hours before the sun. Mercury and Saturn are too close to the sun to be visible.

Shown on Map

The June stars are shown on the maps as they appear at 11:00 p.m. on June 1 and 10:00 p.m. on June 15. Most brilliant is Vega, in Lyra, the lyre, high in the east. Below Lyra is Cygnus, the swan, in which first magnitude Deneb can be found. To the right of Cygnus is Aquila, the eagle, with Altair, which has the same magnitude.

The Great Dipper, in the northwest, is useful for finding several other groups. Almost everybody knows the pointers, the two lower stars in the dipper's bowl which show the direction, to the right, of the pole star, which stands almost over the north pole of earth. But you can

also follow to the south the curved handle of the dipper. The first bright star you come to is Arcturus, in the figure of Bootes, the bear driver. And still farther the same curved path will guide you to Spica, in Virgo, the virgin.

In addition to Vega, Deneb, Altair, Arcturus and Spica, there are four others shown on the map which the astronomer classes as first magnitude. There is Regulus, in Leo, the lion, to the west, and Antares, in Scorpius, the scorpion, a red star in the south. Low in the northwest is Pollux, one of the twins, Gemini. Finally, there is Capella, in Auriga, the charioteer, which is still visible from 40 degrees north latitude or more northerly points. Farther south, however, it cannot be seen at this time. Even where it is visible, the absorption of the earth's atmosphere diminishes its light so greatly that it looks no more brilliant than a star of the third magnitude. That is why the symbol for it on the map is one of the smaller ones.

Look at Venus

If you have any opportunity to look at Venus through a telescope now or later in the summer, take advantage of it. Probably you will be very much surprised, for you may think, at first, that you are looking at the moon. This month, through a telescope, Venus looks like the moon around first quarter. That is, it appears as a semicircle. And during July and August it will be a cres-

cent. On the other hand, if you had looked at it several months back, it would have been seen as almost circular, like the moon in a gibbous phase, nearly full.

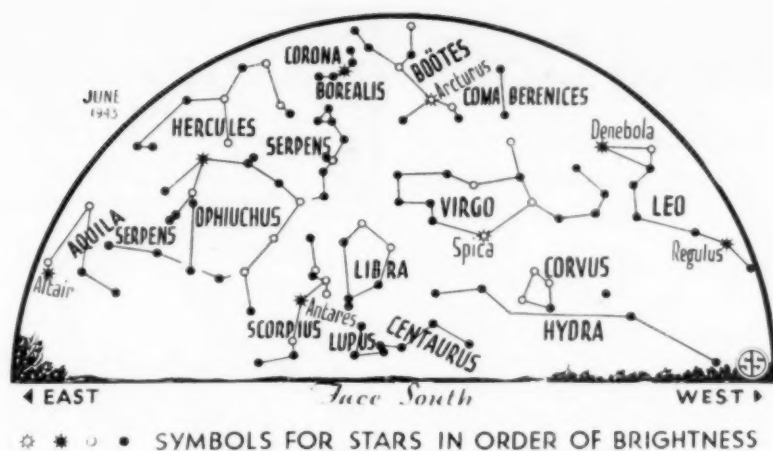
In May scientists celebrated the four hundredth anniversary of the death of the Polish astronomer, Copernicus, and the publication of his great work which first proposed, as a carefully worked out scientific theory, that the earth revolves around the sun. This theory finally displaced the older Ptolemaic universe, in which the earth was at the center.

Confirmed by Galileo

So radical were the ideas of Copernicus, after he published them in 1543, that there was great opposition to them. But finally observations showed their truth. One of the most important of these was a discovery, by the Italian, Galileo. Late in the year 1609, at Florence, he heard of the invention of an optical device which made distant objects seem closer. Without details, he proceeded to make a small telescope, and in 1610 began to look at the stars and planets with its aid. He discovered the four largest moons of Jupiter. As he watched Venus, he found that it changed through a complete cycle of phases, like the moon, from full to new and back to full again.

According to the Ptolemaic theory, all the planets revolved around the earth. Innermost was the moon, then came Mercury, Venus and the sun; with Mars, Jupiter and Saturn beyond. Since this put Venus closer to earth than the sun, and since Venus always stayed in nearly the same direction as the sun, it meant





that her illuminated half would always be turned mostly away from us. Hence, it was expected that it would show a crescent phase. But when Galileo found that it went from crescent to full and back, it became obvious that it was going around the sun; that part of the time it was nearer to the earth than the sun was, and the rest of the time it was farther away. The Ptolemaic theory had no explanation for this, but it was exactly what Copernicus had said was the case.

Announced in Anagram

Scarcely believing what he saw and wanting to make further checks — yet fearful that someone else might anticipate his announcement—Galileo gave his discovery to the world in the form of an anagram, following a rather common practice of that time. He first published the following Latin sentence:

"Haec immatura a me iam frustra leguntur: c. y." This might be translated as, "These things not ripe are read, as yet in vain, by me," which was certainly true for those who read it. A few months later, when he felt surer, he announced the solution. The same letters, rearranged, made another Latin sentence:

"Cynthiae figuras aemulatur Mater Amorum." This means, "The Mother of the Loves imitates the phases of Cynthia." "The Mother of the Loves," of course was a poetic expression for Venus, while Cynthia referred to the moon.

During the coming months, anyone with a telescope can see what Galileo saw as he watched Venus in 1610. On the 16th of last November, it was exactly on the opposite side of the sun from us, and invisible. But, by the first of the year, it had swung far enough to the east of the sun to remain in the west for a

short time after sunset. It was still far beyond the sun, and so most of its sunlit hemisphere was turned toward us. Through a telescope, it appeared as a circle.

On June 27, it will have swung to its greatest angular distance east of the sun, a little over 45 degrees away, and by now the planet is beginning to come nearer the earth than the sun's 93,000,000 miles. At the "greatest eastern elongation," on the 27th, a line from the sun to Venus will make a right angle with one from the earth to Venus. Thus, only one-half of the planet's illuminated hemisphere will be visible, and we have the "half-moon" effect. From then on, until Sept. 5, when it will come between earth and sun, and will be invisible, more and more of the bright half will turn from us, producing the crescent phase. But during the coming autumn, when Venus will have moved to the west of the sun, it will appear in the morning sky before sunrise, and the phases will be repeated, but in reverse order.

Venus Changes Size

There is one great difference however, between the Moon and Venus in their changes of phases. The distance of the moon ranges from about 221,000 to 253,000 miles, hardly enough to make any noticeable difference in its size, unless measured with instruments. Further, the times of perigee and apogee (when it is nearest to or farthest from the earth) can come at any phase. Hence, the moon's diameter in the sky looks about the same whether crescent or full.

With Venus, on the other hand, the full phase comes when it is beyond the sun, and the distances of the earth from the sun and Venus from the sun (67,170,000 miles) are added to get the

distance of Venus from us. This is about 160,000,000 miles. But when Venus is approaching its narrowest crescent, it is vastly closer, about 27,000,000 miles away, and hence, with the same magnifying power of the telescope, it appears many times as big. To an astronomer on Mars, next planet out, the earth would be seen to undergo similar changes.

Celestial Time Table for June

June	EWT	
1	1:00 p.m.	Venus passes Jupiter.
2	6:33 p.m.	New moon.
6	9:49 a.m.	Moon passes Jupiter.
7	7:38 p.m.	Moon passes Venus.
7	6:00 a.m.	Moon farthest distance 251,800 miles.
10	10:35 p.m.	Moon in first quarter.
18	1:14 a.m.	Full moon.
	2:00 a.m.	Mercury farthest west of sun; low in east at sunrise.
19	11:00 a.m.	Moon nearest, distance 223,700 miles.
22	3:13 a.m.	Summer solstice: sun farthest north, summer begins.
24	4:08 p.m.	Moon in last quarter.
25	12:40 a.m.	Moon passes Mars.
27	9:00 p.m.	Venus farthest east of sun.

Subtract one hour for CWT, two hours for MWT, and three for PWT.

Science News Letter, May 29, 1943

White paint applied to beehive covers keeps the inside temperature lower on hot summer days.



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GEOGRAPHY

Aleutians Have Long Days

Night obscures these important islands for only five hours out of each 24, but there is a great deal of rainfall and fog.

► THE LONG daily hours of daylight and twilight which come during the summer months in the northland now illuminate the Aleutian Islands, for nearly 19 hours out of each 24. The hours of daylight will constantly increase up until about the end of June. This means longer days for daylight bombing of the Japanese bases on Kiska.

Dutch Harbor is at about the same latitude as Edmonton, Canada, 300 miles north of the United States-Canadian line and the Glacier National Park in Montana. It has a far different climate, however, because the warm Pacific current sweeps the Aleutians and causes more uniform and higher temperatures, together with much rainfall and fog.

The Aleutians stretch westerly 1,200 miles from the end of the Alaska Peninsula nearly to Siberia. Attu, the western American island, is less than 800 miles from the southern tip of the Kamchatka Peninsula. This in turn is only about 800 miles from the north coast of Hokkaido, the north island of Japan proper, and about 1,400 miles from Tokyo.

The Aleutian Islands have been described as a string of barren, rocky, treeless islands, stretching like stepping stones from Asia to North America. The ancestors of the American Indians and Eskimos probably followed these stepping stones in their hazardous migrations from Eastern Asia to Alaska, and then to the south and east. It would seem that the Japanese thought they

could use the same stepping stones to reach the American continent. But now they will be used in reverse.

The importance of the Aleutians to the American armed forces is strategic. First they must be cleared of the enemy. Then they can be used for bases between America and Asia. They are close to or on the shortest routes across the Pacific.

The great circle route from San Francisco to Tokyo, 5,225 miles, passes south of the Aleutians. The 5,000 mile great circle route from Seattle to Tokyo almost touches the islands. The air route from Fairbanks, Alaska, passes over them. From Seattle to Dutch Harbor is 2,200 miles, and from there to Attu about 850 miles. Safe harbors and airfields along the Aleutians are of the utmost importance to the Allied Nations at war with Japan when the all-out attack on the Japanese homeland begins. They are important also in delivering aircraft cargoes of food and war equipment to Russia.

The Aleutian Islands can not be used for food production except for fish. They lack the necessary soil. Most of them are uninhabited. They can be used the year around for military bases. They seldom have below zero temperature. But they are always chilly, damp and foggy. The fogs constitute the greatest difficulty in making full use of them.

Science News Letter, May 29, 1943

MEDICINE

Polio Foundation Makes Three-Year Grant

► THE National Foundation for Infantile Paralysis has made a three-year grant totalling \$120,000 to the University of Michigan School of Public Health for continuation of a long range program of study of infantile paralysis and other virus diseases ranging from influenza and atypical pneumonia to chicken pox and mumps. The grant was announced in a joint statement by Basil O'Connor, president of the Foundation, and Dr. Alexander G. Ruthven, president of the University.

Science News Letter, May 29, 1943

GENERAL SCIENCE

NATURE RAMBLINGS

by Frank Thone



Jungle Campcraft

► FLIERS forced to bail out or make crash landings in jungle or desert will have many of their worries taken away by a neat, stoutly bound little book placed in the emergency kit of all aviators flying in the tropics by the Army Air Forces, which tells how to make life possible, and even reasonably comfortable, under wilderness conditions. It might have been called *Every Man a Crusoe*, but it is more prosaically titled *Jungle and Desert Emergencies*.

Ingenious instructions, compactly presented, tell how to turn a parachute into a tent, its pack into a knapsack, any piece of suitable fabric into a lining for a miniature cistern to catch rainwater. Or the parachute can also be turned into an effective fish net.

Don't be afraid of wild animals, the fliers are told: they're at least as much afraid of you as you are of them. Much more to be feared than serpents or leopards are the much smaller flying and creeping things—mosquitoes, ticks, mites, botflies, leeches. All of them bring dis-

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comfort, some of them bring deadly sickness.

Men can benefit from monkeys, if they use their wits a bit. For one thing, they can watch what the monkeys eat. Anything that a monkey eats, a man can eat. Also, they can eat the monkeys. There is no need to waste precious ammunition on them, either. Several ingenious methods for trapping them are figured, including the old trick of getting the monkey to put his hand into a small hole in a coconut shell for a tempting bait; the animal won't unball his fist once he has grasped the prize, and so gets caught.

But of all man's enforced relations with nature in the jungle, those with plants are most important. Plants offer by far the best supplies of food: fleshy roots, like sweet potatoes or yams run wild; edible shoots, like those of bamboo, big ferns, and palm buds; familiar fruits like bananas, pineapples and coconuts; less familiar ones like hogplums, star apples and the unspeakably malodorous but nutritious durian.

Four of the more dangerous poisonous plants of the jungle are also listed: sanbox, manzanillo, cowitch, and the deadly strychnos. All species mentioned in the text are pictured in clear, unmistakable line drawings.

Most of the booklet is devoted to the problems of survival in the jungle; staying alive in the desert may be just as difficult, but not as complex a job. Mainly it has to do with conservation of water, protection against sun and heat, and food sanitation. The desert-stranded flier is warned against eating food which friendly Arabs may offer him: offered with the best will in the world, it is almost certain to be contaminated with germs more dangerous than poison. Buy or barter raw food and cook it yourself; then you will be safe, is the counsel.

This guidebook is the result of exhaustive research by the Safety Education Division of the AAF Flight Control Command. Noted scientists were interviewed, every available authority on life in the jungle and desert was consulted.

No detail was overlooked in trying to make the book practical and readable. The cover is vermilion so it can be readily distinguished against jungle or desert background if lost. The binding glue contains insect-repellent powder and the pages are water-resistant. The type face and illustrations are especially designed for reading under adverse lighting conditions. The book itself fits easily into the hip pocket.

Science News Letter, May 29, 1943

PUBLIC HEALTH

D. C. Fights Malaria

Clean-up of mosquito breeding areas intensified as nation's capital received three cases of malaria from foreign countries.

► THE FIGHT to protect the nation's capital against malaria, which some scientists believe may be the great plague of the present war, is being intensified, Dr. George C. Ruhland, District of Columbia Health Officer, announced.

There are three "bona fide cases of malaria" in Washington now, the health department records show. The patients have recently returned from foreign countries where they had been employed on government business.

Importation of more cases of malaria and possibly other communicable diseases are anticipated by Dr. Ruhland because of modern swift air transportation which brings people to Washington from Africa, India or the Southwest Pacific in a few days instead of weeks.

Only one type of mosquito transmits malaria in the Washington area. This is the *Anopheles quadrimaculatus*, familiarly known as "the quad." A survey, part of a program for "control of malaria in war areas," was made by the District of Columbia Health Department and the U. S. Public Health Service last summer. This showed that the chief breeding grounds for "the quad" around Washington are in the areas around Oxon Run Creek and in the Potomac River in the vicinity of Oxon Bay. A few malaria mosquitoes were found here and there throughout the city but not in sufficient numbers to warrant alarm.

As a result of the survey findings, extensive oiling, ditch digging and draining operations were undertaken around Bolling Field, Blue Plains, the National Arboretum and the grounds of St. Elizabeth's Hospital, where a number of paresis patients are receiving malaria treatment.

Oiling, "dusting" with Paris green and mosquito trapping will be intensified in about a month when the mosquito breeding season will be at its height. Dusting operations by airplane will be extended to include the Marine Base at Quantico, Va.

Dr. Ruhland invited the public to report suspected mosquito breeding places to the Health Department which will

investigate to determine whether or not the malaria mosquito is involved.

"We are particularly suspicious of the fish pond with the sprinkling water fountain," Dr. Ruhland said, adding that tin cans and other receptacles which fill up with water and the smaller stagnant pools are usually only sources of the pest mosquito which does not carry malaria.

Science News Letter, May 29, 1943

● RADIO


Saturday, June 5, 1:30 p.m., EWT

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Boris Berkman, president of the Milkweed Products Development Corporation, will speak on "Milkweed as a War and Peace Crop."



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NUTRITION

Labor Shortage Hits Sugar

Beet-raising farmers unwilling to put in more than two-thirds of acreage they planned to plant. Beet field hands can't be hired with jobs in war plants available.

► SUGAR-MAKING, which ought to be the sweetest job in the world, is always running into something sour. This year it's the unwillingness of the beet-raising farmers to put in more than two-thirds of the million acres they had expected to plant. Since about a third of our national sugar supply comes from domestically raised beets, this means a reduction of roughly 10% in the sugar we'll have next year—unless the shipping situation improves to the point where more cane sugar can be brought in from the tropics.

Labor shortage is primarily to blame for the situation. There is a great deal of "stoop labor" involved in raising beets, and since high-wage war-industry plants have sprung up in practically every beet-raising area in the country, beet-field hands simply aren't to be hired.

Department of Agriculture officials are less worried than the sugar manufacturers. They point out that the acres that will not raise beets this year will be in other crops, all of them needed by the armed forces and by workers on the home front. Indicated replacement crops are mainly potatoes, beans and alfalfa—the latter, of course, to become meat and milk, via the farmyard feed rack.

This labor shortage trouble crops up just as the beet-sugar industry had been helped out of another bad fix—a threatened shortage of seed. Thanks to the plant breeders of the Department of Agriculture and state experiment stations, we have become independent of

European beet-seed growers, as we are becoming independent of foreign garden-seed growers.

The story of American sugar-beet seed development is told by Dr. G. H. Coons of the U. S. Department of Agriculture. There is a good deal of drama in it—and more than a good deal of hard use of scientific brains.

Prior to the first World War, although we had something over two-thirds of a million acres in sugar-beet production, we relied entirely on European growers for seed. They had the experience, also cheaper labor, so that seemed the best thing to do.

That war taught us some hard lessons. There had to be long and anxious negotiations, to get even a trickle of seed through from blockaded Germany. We even had to put up a bond to make a return shipment of the empty gunny-sacks!

At the same time, American sugar-beet fields were under a destructive dual attack here at home. In the West, beets were literally curling up and quitting, under the scourge of a virus disease called curly-top, which crippled their leaves and made them unable to manufacture sugar in the normal way. In the East, there was an almost equally destructive disease called leaf-spot, caused by a fungus.

To meet these and other threats to the Great American Sugar-Bowl, plant scientists of the Department of Agriculture and the agricultural experiment stations of sugar-beet producing states went

to work to develop disease-resistant strains, and to introduce them into cultivation.

They succeeded in producing the kinds of new sugar beets they were after. No one strain is good for the whole country, for the curly-top-resistant kind good for Western conditions is not immune to the leaf-spot prevalent in the East. Conversely, the leaf-spot-resistant variety cannot stand up to curly-top in the West. There are also special strains fitted for local conditions of soil and climate, that are not good outside their particular areas.

In the West, partly as a result of insistence by the scientists who worked out the new varieties, home production of seed was undertaken during the 1930's, so that the region as a whole was little disturbed by the cutting off of beet seed imports by the second World War.

Growers in the East had let the job of seed production slip back into the hands of European growers, until the total beet seed imports had climbed to around 15,000,000 pounds in 1937, as compared with 13,000,000 pounds grown in the United States—principally in and for the Western fields.

Imports slumped heavily during the first part of the war, though substantial quantities still came in until 1941, since when practically no seed has been received from abroad. Domestically produced seed, however, after a slump from well over 13,000,000 pounds in 1938 and 1939 to not much more than half that in 1940, has now gone up to the hitherto unapproached peak of 18,000,000 pounds.

Science News Letter, May 29, 1943

Iridium, a rare metal used in alloy to harden platinum, is now restricted by the government and may be used only in electric contact points, fuse wire for detonators, electric primers, and laboratory ware.

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✿ **TRAILER HOUSES** for war workers will be constructed by 25 trailer makers for the duration. The model to be followed has the better features of present commercial trailers. Standardization down to the smallest screws and nails will permit the interchange of repair parts and make allocation of construction materials easier.

Science News Letter, May 29, 1943

✿ **SALT AND PEPPER shakers** and sugar dispensers are now made of a very light transparent plastic especially for use on airplanes. They are not easily broken and are unaffected by changes of temperature.

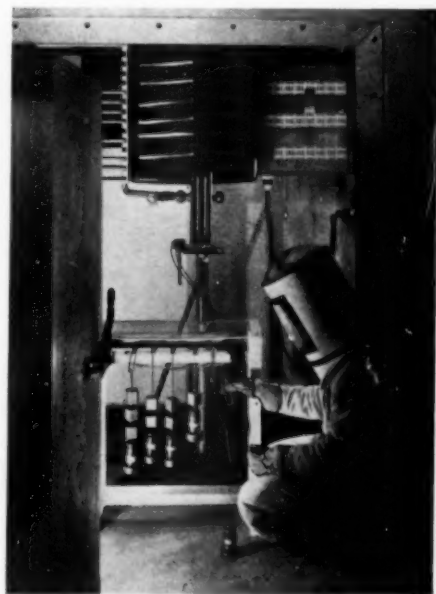
Science News Letter, May 29, 1943

✿ **PAPER BAGS** can substitute for traditional Indian jute containers for shipment of Cuban sugar, recent tests show. Six-ply, 200-pound bags were toppled from 25-foot piles without breakage; they were sprayed with water for 20 minutes and moisture did not go beyond the first ply. A test shipment of 500 bags between the United States and Cuba further proved their practical value.

Science News Letter, May 29, 1943

✿ **PLASTIC PLANE** parts are shown being tested by an engineer at a temperature of 67 degrees below zero. Stratosphere weather conditions are simulated here to help develop improvements for the Air Forces.

Science News Letter, May 29, 1943



✿ **A NEW TELEGRAPH code tape perforator**, compact in design, produces tape as cleanly and as accurately as any complex keyboard perforator, it is claimed. Light touching a dot key, dash key, or spacer bar closes electrical contacts. A die mechanism, driven electrically, perforates and advances the tape through the machine.

Science News Letter, May 29, 1943

✿ **A NEW COMPACT dust-collecting machine** sucks dust-laden air from grinding wheels or other tools and separates the dust. The air is forced into a miniature cyclone which throws the heavier particles of dust into a hopper and the lighter dust into a filter chamber. Air returns to the room 97 per cent clean.

Science News Letter, May 29, 1943

✿ **A TOBACCO PIPE** with the inside of the bowl threaded as if for a machine screw, received a recent patent. With it is a milling cutter to keep the grooves clean. The smoke is said to be drawn through the grooves instead of the tobacco in the bowl, thus being cooled and leaving the tobacco uncontaminated by smoke.

Science News Letter, May 29, 1943

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 158.

MILITARY SCIENCE

OSRD Head Invents Improved Rifling Method

➤ **THE HEAD** of the principal national organization for coordinating and making effective for war purposes American scientific resources, Dr. Vannevar Bush, director of the Office of Scientific Research and Development, personally contributes a significant technical advance, among the 580 inventions of the week on which patents have been issued by the U. S. Patent Office.

Dr. Bush's invention is an improved method for rifling artillery, which makes practicable a type of gun bore which ordnance men have long regarded as ideal but unattainable in practice.

Gun bores at present are cylindrical or practically so. Much better, for the purposes of obtaining smoothness of starting and movement of the projectile when fired, would be a bore having a cylindrical portion near the breech, a

gradually tapering portion throughout the greater part of the length, and another cylindrical portion near the muzzle. Such a gun might be rifled with existing tools, but the cost in money and time would be prohibitive.

In Dr. Bush's method, the barrel of the gun is bored and reamed to approximately the desired conformation. Then a plug, with its outer dimensions closely corresponding to the desired shape of the finished, rifled interior, is inserted. This plug has a groove along one side, in which two long wedges operate. These wedges press against the smooth interior of the bore a series of cutting tools, linked into an endless chain, which is slowly drawn through the gun while it slowly rotates around the stationary plug. This produces a series of twisted grooves, properly rifling the gun, no matter what the curves of its breech-to-muzzle profile may be. The inventor has assigned rights in his patent, no. 2,319,206, royalty-free to the government.

Science News Letter, May 29, 1943

A million tons of nonferrous metals were supplied by scrap dealers in 1942; mostly copper, lead, tin, aluminum and zinc.

The tuna fish catch for the first three months of 1943 was 40% greater than that of the same period in 1942, but is still below normal.

Nitroparaffins, recently developed for commercial uses, are used as solvents in cellulose acetate and acetobutyrate lacquers and in adhesives used in connection with these products.

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First Glances at New Books

► **ULTRA-HIGH FREQUENCY** waves have widespread secret uses in America's war machine; important peacetime applications are promised. To help alleviate the shortage of specialists in this field, **ULTRA-HIGH FREQUENCY TECHNIQUES** (D. Van Nostrand Co., \$4.50) has been prepared by J. G. Brainerd, Glenn Koehler, Herbert J. Reich and L. F. Woodruff. This important text covers the course outlined by representatives of some 40 institutions for students on the level of electrical engineering and physics seniors. A useful bibliography is included.

Science News Letter, May 29, 1943

► **RIISING TIDE** of discovery in physical science affects our lives in many ways. Rogers D. Rusk takes the lay reader **FORWARD WITH SCIENCE** (Alfred A. Knopf, \$3.50) in a round-up of recent developments, pointing out their significance along the way.

Science News Letter, May 29, 1943

► **A SHORT HISTORY** for Americans is **THE ARABS** by Philip K. Hitti, based on the author's more complete book, **The History of the Arabs**. It reviews the principal events in the history of these great people. It will interest persons with relatives in North Africa (*Princeton Univ. Press*, \$2).

Science News Letter, May 29, 1943

► **AFRICA** and the transformations it is undergoing due to the war is interestingly discussed in **AFRICA-FACTS AND FORECASTS** (Duell, Sloan and Pearce, \$2.75). After the war Africa will no longer be justly called a slumbering continent, according to the author, Albert Q. Maisel. Powerful economic and social forces causing rapid changes are discussed.

Science News Letter, May 29, 1943

► **A MANUAL** to furnish elementary information in metalwork to students is **METALWORK, TECHNOLOGY AND PRACTICE**, a new text book by Oswald A. Ludwig (McKnight and McKnight, \$4).

Science News Letter, May 29, 1943

► **THE END OF GARDENING** is not the garden, but the kitchen. With this unique point of view Helen Morgenthau Fox presents us **GARDENING FOR GOOD EATING**, (Macmillan, \$2.50), wherein she tells briefly about the things that grow in the garden, directs how to cultivate them,

and finally gives recipes for preparing and serving them. A book bound to be popular, especially with women gardeners.

Science News Letter, May 29, 1943

► **PROF. H. E. JAKES** of Iowa Wesleyan adds another to his useful series of little handbooks, in **PLANTS WE EAT AND WEAR**, an illustrated key to economic botany. Descriptions are brief but sufficient, illustrations compact but clearly illustrative of critical characters. Whether

you are a professional botanist or just eat and wear things, you will find matter of interest here. (Author, Mt. Pleasant, Iowa, \$1.50; \$2.50, cloth.)

Science News Letter, May 29, 1943

► **CARONI RIVER** in Venezuela — a "Great South American Klondike" where gold and diamonds are found in the river bed is described in **CARONI GOLD**, by a mining engineer, L. R. Dennison (*Hastings House*, \$2.50).

Science News Letter, May 29, 1943

Just Off the Press

AIRCRAFT ELECTRICAL SYSTEMS—William F. Jorch—*Ronald Press*, 208 p., illus., \$2. Their Maintenance and Servicing; a Manual for Mechanics.

THE AMERICAN ANNUAL 1943: An Encyclopedia of the Events of 1942—A. H. McDannald, editor—*Americana Corporation*, 868 p., illus., \$10.

THE ARABS—A Short History—Philip K. Hitti—*Princeton Univ. Press*—224 p., \$2.

ARE WARS INEVITABLE?—John R. Swanton—*Smithsonian Institution*—36 p., free upon direct application to Smithsonian. War background studies No. 12.

BABIES ARE HUMAN BEINGS—C. Anderson Aldrich and Mary M. Aldrich—*Macmillan*, 128 p., illus., \$1.75.

BRAZIL IN THE MAKING—Jose Jobim—*Macmillan*, 318 p., \$3.50.

CARNEGIE INSTITUTION OF WASHINGTON: Year Book No. 41, July 1, 1941—June 30, 1942—With Administrative Reports through December 18, 1942—*Carnegie Institution*, 309 p., \$1, paper, \$1.50 cloth. See SNL, Dec. 26, 1942.

CARONI GOLD—L. R. Dennison—*Hastings House*, 274 p., illus., \$2.50.

CHILDREN CAN HELP THEMSELVES—Marion Olive Lerrigo—*Macmillan*, 219 p., \$2.25. A description of the health habits of normal children.

CHIMPANZEES—Robert M. Yerkes—*Yale Univ. Press*, 321 p., illus., \$5. The story of Yale's famous ape colony.

ELECTRICITY FOR EVERYONE—Joseph R. Lunt and William T. Wyman—*Macmillan*, 649 p., illus., \$3.25.

ESSENTIALS OF PLANE AND SPHERICAL TRIGONOMETRY—Clifford Bell and Tracy Y. Thomas—*Holt*, 142 p., \$1.80. Text book "with special emphasis on the computational or practical side of the subject."

GERMANY TOMORROW—*The American Friends of German Freedom*, 17 p., 25c. Pamphlet.

AN INTRODUCTION TO INDUSTRIAL MYCOLOGY—George Smith—*Longmans Green*—260 p., illus., \$6. 2d ed.

THE IRISH STONE AGE—Hallam L. Movius, Jr.—*Macmillan*, 338 p., illus., \$7.50.

MASTERS OF MOBILE WARFARE—Elbridge Colby—*Princeton Univ. Press*, 155 p., \$2.

METALWORK: Technology and Practice—Oswald A. Ludwig—*McKnight & McKnight*, 397 p., illus., \$4.

A TEXTBOOK OF APPLIED MICROBIOLOGY AND PATHOLOGY—By Thurman Brooks Rice—*Macmillan*, 397 p., illus., diagr., \$3. 2d ed.

OUR ARMED FORCES—U. S. Office of Education of the Federal Security Agency—published in cooperation with the U. S. Infantry Association, 130 p., 35c.

OUR SERVICEMEN AND ECONOMIC SECURITY—Robert H. Skilton—*American Academy of Political and Social Science*, 218 p., \$2 paper, \$2.50 cloth. (The Annals of the American Academy of Political and Social Science, v. 227, May 1943). Some business problems of men in service.

PHYSIOLOGY IN AVIATION—Chalmers L. Gemmill—*Charles C. Thomas*—129 p., \$2. Modern fast planes are no better than the pilots. This book is by the instructor in physiology, School of Aviation Medicine, Naval Air Station, Pensacola, Florida.

SCIENCE—Audio Visual and Teaching Aids—Lili Heimers—*New Jersey State Teachers College*, 42 p., 75c. For librarians in the public schools of the State of New Jersey; they may obtain one copy free upon application.

SELECTION OF OFFICER CANDIDATES—William L. Woods, Lucien Brouha and Carl C. Seltzer—*Harvard Univ. Press*, 46 p., 4 plates, 75c.

SOLAR RELATIONS TO WEATHER AND LIFE—H. H. Clayton—*Clayton Weather Service*—two volumes, illus., \$3. each.

THE STEEL INDUSTRY—Josephine Perry—*Longmans, Green*, 126 p., illus., \$1.75.

THEY NEED NOT VANISH—A Discussion of the Natural Resources of Michigan—Helen M. Martin, ed.—*Dept. of Conservation, State of Michigan*, 294 p., illus., \$1.

THIS EXCITING AIR—The Experiences of a Test Pilot—Boone T. Guyton—*McGraw-Hill*, 219 p., illus., \$2.

YOUR CAREER IN CHEMISTRY—Norman V. Carlisle, *Dutton*, 251 p., illus., \$2.50.

YOUR CHILD, HIS FAMILY AND FRIENDS—Frances Bruce Strain—*Appleton-Century*, 210 p., illus., \$2. Revised from articles which appeared in *Parents' Magazine*.

Science News Letter, May 29, 1943